TEXAS WATCH

Newsletter of Volunteer Environmental Monitoring Programs in Texas

PD-016/97-3 Summer 1997

This issue...

This issue looks at the activities and events that took place at this year's Meeting of the Monitors (MOM), including analysis of a new nutrient testing method. Our Profiles section highlights the Boy Scouts of America's involvement with Texas Watch, and will also introduce our new Volunteer Coordinator. On the quality control side, the top ten most common monitoring mistakes are reviewed, along with a new method of determining reagent expiration dates. Also, please take a few minutes to fill out the attached survey form that allows you the opportunity to renew your Texas Watch newsletter subscription, and at the same time help plan next year's Meeting of the Monitors.

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expert

By Steven Hubbell, Lower Colorado River Authority
presented at the '97 Meeting of the Monitors

is it profound arrogance
or naive optimism
to think we may capture an inkling
of the essence of brooks and springs,
the majesty of a gulf,
the magic of streams?

how can a man aspire to conjure
the teeming life residing
beyond our wildest dreams?

yet, though I am no whale,
I have touched two oceans;
no eagle,
I have flown from sea to sea.

for I am human, prone to contemplation,
my vision may reside where so dictate I.
thus am I blessed, for I can contemplate the water;
and blessed again, for I can share my love of rivers
with you.

'97 Meeting of the Monitors, Austin Style

Greg Bryant, Texas Watch Communications Coordinator

As most of you know, Texas Watch held its sixth annual Meeting of the Monitors this March in Austin. In past years, the Texas Watch statewide meeting has examined the role volunteer monitors play in managing watershed resources. This year's conference highlighted monitoring programs, skills, and techniques, which supported the theme "Integrating Professional and Volunteer Monitoring."

The three-day conference offered more than 30 different workshops, presentations, and field trips, and drew almost 200 volunteers, partners, and presenters from Texas and surrounding states. Many of the conference presentations, including *Community Solutions to NPS Pollution, Monitoring in an Urban Watershed*, and *How NPS in Local Watersheds Affects Texas Coastal Waters*, emphasized nonpoint source (NPS) pollution and the technologies for reducing

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or controlling the problem. Other sessions, such as *Education & Teacher Resources, Environmental Education Programs*, and *Student International Monitoring Exchange*, provided participants with information on valuable curriculum and educational programs related to water quality, NPS issues, and other environmental issues.

Additional conference workshops offered volunteers expert instruction on analyzing monitoring data, data presentation methods, and presentation skills. Conference attendees were also encouraged to participate in a question and answer session with representatives from state and federal agencies associated with volunteer monitoring. The plenary panel discussion provided insight into the current role of environmental monitoring as well as possible strategies for addressing future environmental needs through monitoring efforts.

A popular new session, *Environmental Monitoring and the Internet*, provided participants with a tour of the resources available through the new Texas Watch web site (www.tnrcc.state.tx.us), as well as related environmental monitoring web pages. Use of the Internet as a tool for communicating with other monitors, recruiting new volunteers, and as a method of submitting and accessing volunteers' data was also discussed.

Also well attended was a session entitled *Texology: Lessons in Texas Biogeography*. Defined as the "knowledge of nature in Texas," Texology is a general systems approach to environmental orientation, focusing from the global perspective down to the unique eco-region that is Texas.

Although a new topic this year, the session drew a standing room only audience that was captivated by the presentation's creator, Randy Sowell, a farmer, rancher, environmentalist and educator.

Randy Sowell's "Texology" program drew a standing room only audience.

But the topic that generated perhaps the most interest among participants was the *Biological Monitoring & Aquatic Ecology* workshop. Offered in two repeat sessions, the overview of the new Texas Watch Benthic Macroinvertebrate Monitoring Program was attended by over half of all conference participants. A follow-up field trip allowed two groups of monitors to participate in actual sampling events, including collecting and sorting "bugs," and assessing stream habitat. The field session had the added benefit of providing data that will be used in an ongoing Texas Watch NPS project.

Additional field trips to local best management practices (BMPs) sites, a University of Texas water research facility, and a national award-winning environmental education classroom were also well attended. Those who didn't mind getting a little wet had the opportunity to explore Austin's unique Barton Springs/Creek watershed, and other local geological features of the Balcones Fault region.

The theme of integrating professional and volunteer monitoring was brought full circle at the conference's Awards Banquet, where many of this year's outstanding volunteers and partners were recognized for their use of data beyond the scope of Texas Watch monitoring. These award winners' active participation with local communities, businesses and organizations, often provided the data and expertise necessary to influence local water quality decisions and further outreach and education efforts.

Planning for '98 MOM

In an ongoing effort to improve the experience, planning for next year's meeting is already underway, and Texas Watch wants your help. You will find a survey in this issue relating to future MOM workshops, field trips, event locations, and overall schedule of activities. Please take a few minutes to fill out this postage-paid mailer. Your responses will help us identify new areas of interest for the "1998 Meeting of the Monitors," and make it even more successful than this year's event.

The Big Experiment: Nutrient Test Results Revealed

by Steven Hubbell, Colorado River Watch Network
(reprinted from Aqua Vitae newsletter, Summer 1997)

At the Meeting of the Monitor's annual Partner's Meeting, Steven Hubbell of the Lower Colorado River Authority's Colorado River Watch Network, presented findings from tests performed with the LaMotte nitrate and phosphate tests used by River Watch monitors. The following is a summary of those findings.

Colorado River Watch Network monitors at the February Mid-Winter's Monitor Meeting conducted a nutrient test experiment as a quality control check for the LaMotte nitrate (3703/Nitrate TesTabs) and mid-range phosphate (R-3114) tests used by River Watch monitors. Each of 11 monitors performed eight nutrient tests (four nitrate and four phosphate tests) using standard solutions prepared by the LCRA Environmental Lab.

Findings. Figures 1 and 2 graph the mean (average) values for tests performed by monitors and the "known" values determined by the lab. The results in the graph are arranged in ascending order, from lowest to highest concentration for the nutrient represented, in order to visually clarify the findings. These graphs demonstrate three noteworthy findings. First, the nitrate test seems to be more accurate than the phosphate test, especially when higher concentrations of the nutrients are present. Second, the results for both nitrates and phosphates follow the curve, from lower concentrations to higher concentrations of nutrients. And third, once nutrient concentrations rise above the minimum detection limit for each test (1 mg/L NO3-N, 0.17 mg/L PO4-P), the average results for both nutrient tests were **less than** the known values.

Interpretation. The results of this experiment raise the following issues. First, individual data points do not stand alone, but must be viewed in the context of all available water quality information. Second, volunteer monitor nutrient test results appear to be generally lower than actual field conditions. This reinforces the concept that elevated nutrient levels detected in the field should be taken seriously. Third, interpretation of color comparators is notoriously subjective, and there appears to be a tendency for monitors to estimate toward the lower end of the color scale rather than higher.

The Comparator Interpretation Factor. After the monitors performed the eight tests, each was asked to look at a series of color comparators containing nutrient samples prepared by a trainer, and to record their interpretation of these values. The results of this "comparator interpretation" phase of the experiment were compared with the results of the individual monitor tests to determine whether the color interpretation procedure contributes significantly to the variation in values recorded by monitors. Standard deviations from the mean were calculated to compare the variation in results (precision) for each test. No significant difference in precision (standard deviation from the mean) was found between results of the individual tests and results recorded for the color comparator interpretation of the samples prepared by the trainer (Beth Davis, biologist with the City of Austin Drainage Utility/ Environmental Resource Management staff). In other words, results were no more and no less varied whether monitors performed the tests or they were interpreting tests performed by another individual. This suggests that comparator inter-

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Figure 1

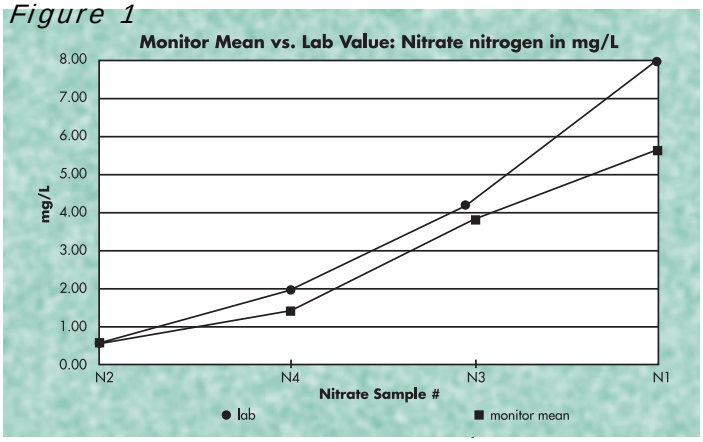
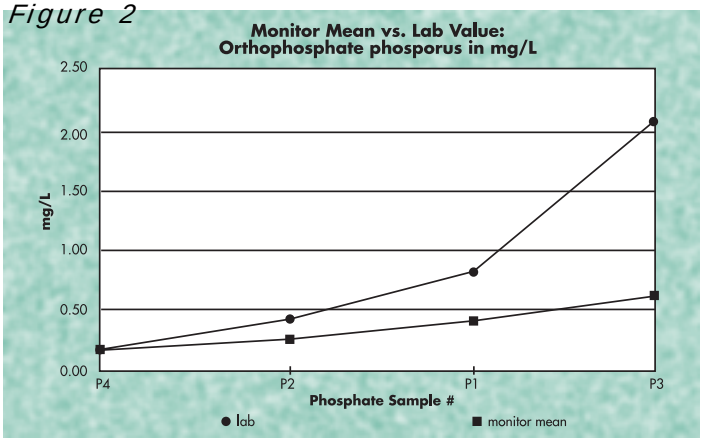


Figure 2



PROFILES & PERSPECTIVES

SCOUTS & TEXAS WATCH

By Glenn Buckley
Chairman, Conservation Committee, Sam Houston Area Council
Boy Scouts of America

This is the first of two articles on the involvement of the Boy Scouts of America in the Texas Watch program. The intent is to illustrate how youth organizations can use volunteer monitoring to attain their own developmental goals, while also providing a service to their communities, the state, and the environment. The basis and program goals for the scouting involvement, and a brief discussion of some of the data gathered at a scout camp in the San Jacinto watershed will be highlighted. The second part of the series will focus on the related educational goals and activities, and discuss how Texas Watch environmental monitoring can be used to help satisfy Boy Scout advancement requirements.

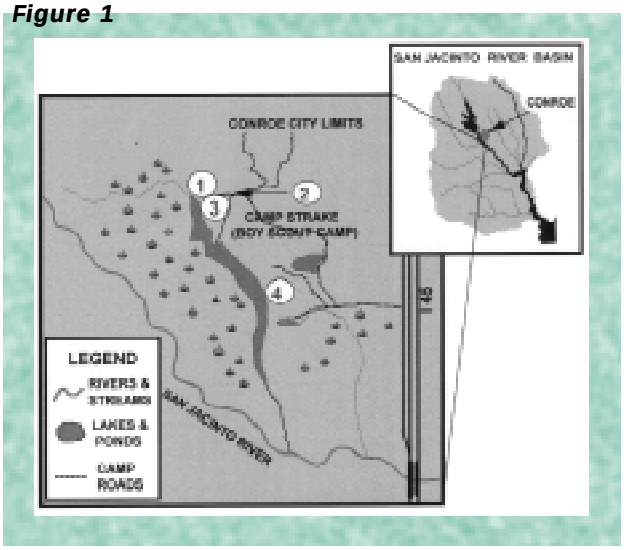
Boy Scout programs in America have historically emphasized conservation and natural resource stewardship as elements of good citizenship, so it seemed appropriate when the Sam Houston Area Council of the Boy Scouts of America recently joined Texas Watch as a partner. Geographically this council includes most of the San Jacinto River Basin and portions of the Brazos, Brazos-Colorado Coastal and Trinity River Basins. In addition, more than 90,000 youth and 30,000 adult volunteers are registered in the council, making it the largest in the United States. Consequently, a successful partnership could have a significant impact on youth and adult education, as well as the recruitment of additional environmental monitors.

The partnership is supported by the Houston-Galveston Area Council (HGAC) and is promoted and stewarded by the Sam Houston Area Council's Conservation Subcommittee. The Council's subcommittee has established three objectives for the five years between 1994 and 1999: to support gathering long-term environmental information on the waterways in the council camps; to use monitoring programs as the focus of an educational program on area water quality issues which would improve scouts' and leaders' awareness of how they can help identify existing problems and prevent their recurrence; and to serve as an example to other councils in the state, and encourage their participation.

While the longer-term goals of this program are environmental awareness and active participation of scout units in the monitoring of waterways near their homes, the initial objective is to start with the waterways on the council properties in order to establish a solid core of monitors and trainers. In this way, the monitoring activities and data collected on the Council properties will serve as an example to other scouts and scouters and can be used in ongoing training and environmental education programs. With this in mind, Texas Watch monitoring is now being conducted at two of the Council camps.

The program at El Rancho Cima on the Blanco River between Austin and San Antonio has been underway for four years, while the one at Camp Strake adjacent to Conroe has only been active since 1994. Of the two, the program at Camp Strake is the more advanced in its use as an educational tool, and is in a location more likely to track the impact of adjacent development. Consequently, monitoring results from the Camp Strake sites will be summarized here to illustrate the local monitoring issues

Figure 1



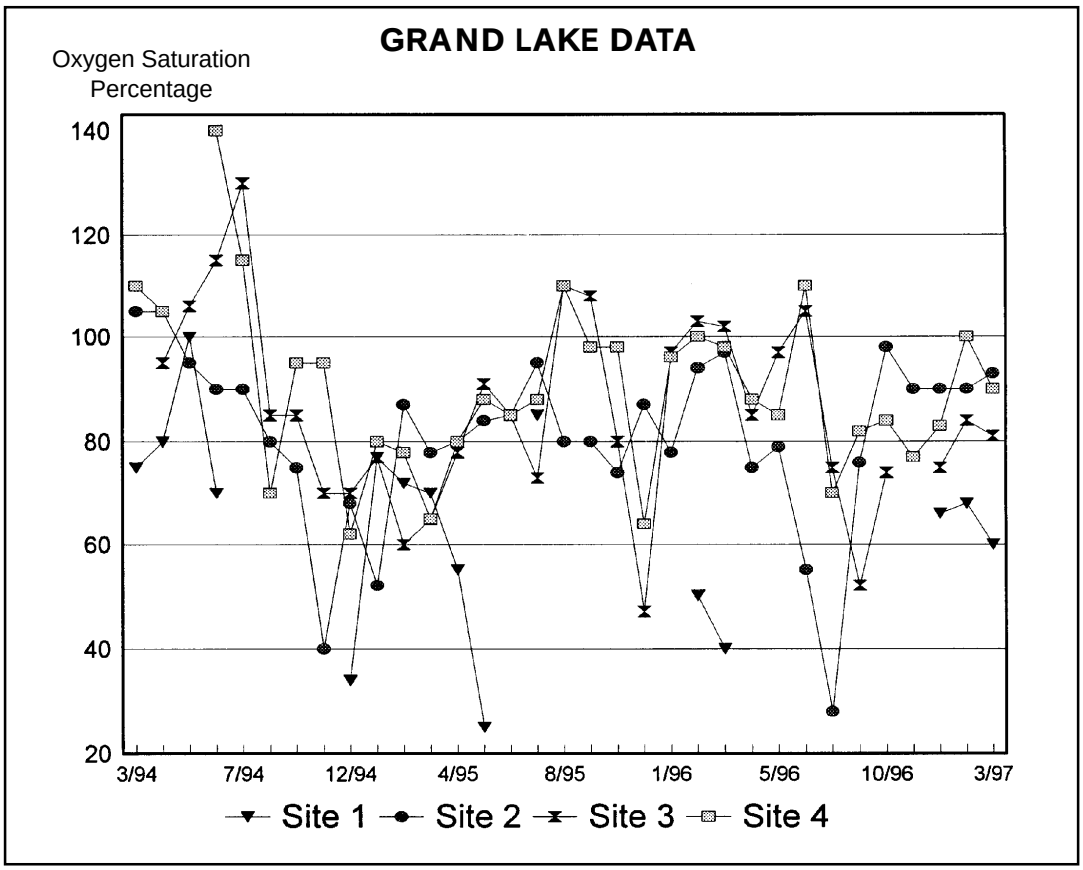
and to establish some background for the following article on education and integration of Texas Watch into the Scouting program.

Camp Strake is located immediately south of the City of Conroe **(figure 1)** and is experiencing the effects of rapid development as the city has expanded to the west and south. The runoff from Conroe is primarily to the south into the San Jacinto River, with at least two streams draining into the camp's Grand Lake before entering the San Jacinto River. As a result, Grand Lake is undergoing significant siltation, as well as influx of pollutants captured in the city's runoff. Older scouters who camped in the area as youths, described the lake as relatively clear when they were growing up, compared to the present. Unfortunately there is no quantitative confirmation of their observations.

Since official monitoring began in 1994 the lake has experienced the flooding of October, 1994, the drought of 1996, and at least one significant algal bloom with an associated minor kill of small fish and invertebrates. This serves to illustrate the difficulty in establishing baseline values for water quality; however, some initial trends seem to be emerging. As illustrated in the oxygen saturation data summarized in the accompanying table, dissolved oxygen is generally 80 to 100 percent saturated. Conductivity in the lake (not graphed) generally runs around 150-250 µmhos/cm (micromhos per centimeter) and pH between 7.0 and 7.5. Exceptions to these values occurred during the drought and algal bloom and immediately after the period of flooding.

Author Glenn Buckley conducts water monitoring training for Scouts and Scout Leaders at Camp Strake near Conroe.

The result of the high siltation from the main stream which feeds the lake **(site 2)** has almost turned Grand Lake into two sub lakes. The siltation has resulted in a small sand bar developing almost completely across this narrow portion of the lake. This may also explain the significant differences in the monitoring variables that are often reported between the southern **(site 4)** and northern stations **(sites 1 and 3)**, particularly in the conductivity and pH data. Near isolation of the two ends of the lake would result in a more immediate change in the north end due to the water quality and quantity of the stream inflow.



The conductivity of the main stream is generally around 250 µmhos/cm but has been as low as 150 immediately after heavy rain and as high as 550 µmhos/cm late in the 1996 drought. Tests for total phosphate, nitrate and nitrite have never produced results within the limits of standard Hach test kits.

Even though the Secchi depth rarely exceeds .25 meters for any part of the

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TEXAS WATCH TOP TEN LIST:
Most Common Mistakes When Completing Environmental Monitoring Forms

By Randle Nichols, Texas Watch

In December of last year, Toni Pennington, Kerry Neiman, and I were hired to review the Texas Watch Volunteer Monitoring Groups files. This involved going through each group's files and assessing their completeness. Most importantly though, we were assigned the task of quality control checking almost 3,000 Environmental Monitoring Forms. In the six months of data review that followed, the three of us began to see an emerging pattern of similar mistakes being made by monitors. In an effort to keep track of the most common of these errors, this "top ten" list was born.

Although rejected by David Letterman as being a bit too lengthy for use on "Late Night" in the "stupid human tricks" segment, (something about it being only a one hour show), we felt the list could still find an appreciative audience. So we cleaned up the language a bit, and have included it here as a guideline to proper monitoring and recording procedures. Avoiding the following "stupid human mistakes" will help ensure that the data you collect are accurate and can be included at the highest level (Level 1) in both the Texas Watch and TNRCC water quality monitoring databases.

So from the home office here in Austin, here are the top ten most common mistakes made when completing a monitoring form...

#10

No *Conductivity Calibration* data - This information is used to verify that the sampling was **completed within 24 hours of calibration**, and that the meter was **properly calibrated**. The calibration time should be noted in **military time** and should always be ***earlier*** than the sample time (showing the calibration was done before sampling, and not the other way around). If these procedures are not followed, the conductivity data cannot be entered in the data base as Level 1 data.

Texas Watch has also spoken with the manufacturer of the monitoring kits (LaMotte) about the recommended temperature range for conductivity standard when calibrating the meter. Texas Watch has previously required that the temperature of the standard be between 22° C and 27° C for accurate calibration. Recent tests performed by LaMotte show that it is more important that the conductivity standard be at a *stable temperature* during calibration than within a specific temperature range.

This means that if you've accidentally left the standard in the trunk of your car, do not attempt to heat it up or cool it off before beginning conductivity meter calibration. Just minimize temperature change by performing the calibration in the same general conditions as where the standard has been stored. Nevertheless, it is always preferable to ***store the conductivity standard at room temperature, and calibrate the meter before traveling to your site.***

#9

No Station-ID* number** - If you do not have a Station-ID number, or don't know it, contact Texas Watch and we will look it up or assign you one. If you do not already have one, it's probably because Texas Watch does not have your monitoring plan on file. To get a Station-ID, you will need to submit a detailed site location description, and a proper map (preferably a U.S. Geological Survey 7.5-Minute Topographic Map) with the site indicated on it. Along with this unique site identification number, you will also be given a short ***Location Description that should be recorded on each and every monitoring form you submit.

#8

No *Sample Depth* - This is the *actual depth* at which you take the water sample (how deep you stick your hand in the water or let the bucket sink) *not* the TOTAL DEPTH at the sampling site. Also, the SAMPLE DEPTH can *never be greater* than the TOTAL DEPTH. Recommended sampling depth is always 0.3 meters (one foot / elbow deep). If the water is less than 1 meter / 3.3 feet deep, sample *at one third of the total depth*. Remember, all depths should be recorded in **meters** as indicated on the form.

#7

***Dissolved Oxygen (DO) titration* more than 0.6 mg/l apart** - If the values for your titrations differ by more than more than .6 mg/l oxygen, repeat the titration on the remaining fixed sample that had the highest DO value. If the range between the two sample bottles is still more than .6 mg/l oxygen, repeat the titration on the fixed sample in the remaining bottle. If the values are still more the .6 mg/l oxygen apart, Texas Watch suggests you perform the entire DO test a second time, using only those second test results on your Monitoring Form. If this is not possible, please indicate all four DO values on your Monitoring Form, but do not average the result as you normally would do with your results. Also, when averaging, **round** the number **up** to **one decimal place**. **Example:** A DO of 9.45 rounds to 9.5, not 9.4.

#6

***Conductivity* units not marked** - We can usually figure this one out, but in extreme cases it can be hard to tell if the units are µS (microSiemens) or µmhos/cm (micromhos per centimeter). The unit of **conductivity measurement is marked on the meter** and should be circled or written on the monitoring form.

#5

No *Secchi Disk* depth - When the water is clear enough or shallow enough to see the bottom, this observation can be made whether you have a Secchi disk or not. If you can see the bottom where you are sampling, the Secchi disc depth should be recorded as *">(greater than) TOTAL DEPTH."* Also, it is important to take the Secchi disk reading *at your site*, not at a deeper point somewhere else.

#4

Incomplete *Site Observations* - For site observations that use specific numbers for describing water color, odor, surface, etc., please use only **one** of the numbers given. For example, if the weather is between cloudy and overcast, pick the description that is closest to the conditions. Our computer database will only accept one digit for these observations.

For the same reason, please **do not** use +, -, >(greater than), or< (less than) symbols for these observations. If necessary, you can always clarify or elaborate in the written *Comments Section*. Also, if you mark *Water Color or Water Odor* observations as "**Other**," be sure to describe your observations in the *Comments Section*.

#3

***Rainfall Accumulation* recorded improperly** - The current monitoring forms request this measurement be recorded in centimeters (round to one decimal place). If you cannot convert from inches (1 inch=2.54 centimeters), be sure to note as **inches** on the form. *FYI - the new data forms coming out in the next few months will start requesting rainfall accumulation in inches. This way you use the information directly from your local weather service.*

#2

***Sampling Time and Miles Traveled* not recorded** - These numbers are very important measures for determining the amount of federal grant funds for which Texas Watch qualifies. Federal grants are a vital source of funding for Texas Watch, and for the support that the program provides to partners and volunteers statewide.

#1

Not checking *Date of Reagents* - Reagents need to be checked before each use to make sure that the chemicals have not reached their expiration date. Texas Watch has recently begun a new policy on determining expiration dates, as well as the shelf life of reagents. For an explanation of these new procedures, see this issue's **QC Corner**.

QC CORNER

New Method for Determining Reagent Expiration

Chris Loft, Texas Watch Aquatic Scientist

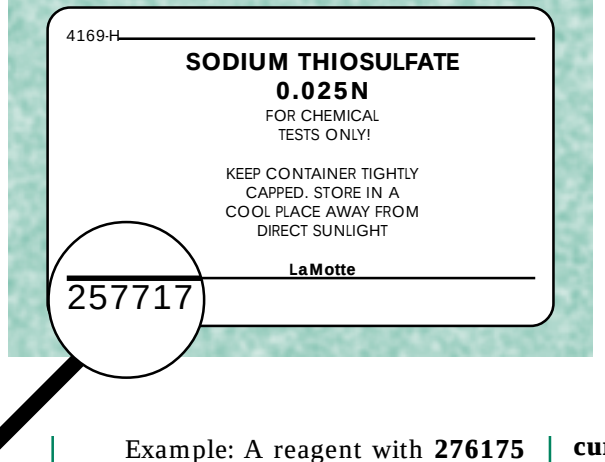
Well, you learn something new every day, and sometimes it's even useful. Recently I had the opportunity to visit with LaMotte, the manufacturer of the monitoring kits, reagents, and just about everything else that Texas Watch volunteers use in their water quality monitoring efforts. During a discussion of shelf-life of the reagents used for Dissolved Oxygen and pH testing, it was discovered that the suggested expiration period currently in use (one year from opening) may not be the best way to guarantee up-to-date chemistry. Some of the chemicals that Texas Watch requires to be disposed of after a year will actually last two to three times longer. Other reagents may be halfway through their useful life by the time they are opened.

To avoid waste, save money, and ensure that reagents are always up to date, Texas Watch is beginning a new method of determining reagents' expirations, and recording that information on the Environmental Monitoring Form.

Determining Reagent Manufacture & Expiration Dates

In the lower left corner on any reagent's label is a six (sometimes seven) digit number. The first three digits of this number indicate the date of manufacture of the reagent. The first two numbers indicate the week, and third number indicates the year (in the 1990's) of manufacture.

How to Determine the Date of Reagents



Example: A reagent with **276175** on the lower left of the label was manufactured in the **27** week (July) of 199**6**, while **0872321** would have been made in week **8** (February) of 199**7**.

Shelf Life of Monitoring Reagents

Manganese Sulfate	3 years
Alkaline Potassium Iodide	3 years
Sulfuric Acid	3 years
Sodium Thiosulfate	1 year
Starch Indicator	1.5 years
pH Wide Range Indicator	2 years

Texas Watch now suggests when opening new reagents, check this manufacture date, and by using the accompanying table, **write the expiration date on each bottle**. By having the expiration date on each bottle, and then checking them each time you monitor, you will always know when they will need replacing.

Recording Expiration Date

Of course going to an expiration date instead of a date of opening for reagents will also require recording information differently on your Monitoring Form. Using the reagent with the shortest shelf life (one year), **Texas Watch will <u>now require</u> monitors to record the expiration date of *Sodium Thiosulfate* in the blank on your Monitoring Form where you are currently recording *Date of the Reagents*.**

In the near future, Texas Watch will be revising the monitoring form to include a space for Sodium Thiosulfate Expiration, along with other modifications to make recording and entering the monitoring data a bit easier on all of us. All other reagents in your kits should have useful lives of more than a year, certainly long enough to be checked at your six-month QC session, or more likely, until they run out. Even so, it's still a good idea to check all your chemistry expiration dates each time you monitor!

ON THE MOVE

Texas Watch's New Volunteer Coordinator

Texas Watch welcomes Michele Blair as the newest member of the team. Michele is a wildlife biologist who comes to us from the City of Austin's Environmental and Conservation Services Dept. where she worked as an Environmental Quality Specialist.

Michele's duties as Volunteer Coordinator will include traveling throughout the state to train volunteers as certified water quality monitors, as well as coordinating monitoring activities between Texas Watch monitors and partners. Michele will play a major role in facilitating quality assurance training and compliance in order to augment the use of volunteer monitor data in watershed management. She will also be working closely with Texas Watch Aquatic Scientists Greg Rogers and Chris Loft, in developing and implementing biological monitoring protocols. And of course, she will always be available to help monitors with any questions or needs they may have in their monitoring endeavors.

Originally from southern California, Michele moved to the redwoods in northern California where she graduated as a wildlife biologist from Humboldt State University. After graduation, she spent three and a half years in Bolivia studying birds and then moved to Austin where she worked for the City of Austin. Michele is also currently pursuing her Master's of Science in Aquatic Biology at Southwest Texas State University in San Marcos.

Michele is a fanatic about sand volleyball and loves to windsurf and travel. But, she says she may be the happiest out on a creek somewhere looking for critters, in the company of her own favorite critter, "Bailey the Moose Dog."

Volunteer Coordinator Michele Blair

Moving Upstairs

Tina Dacus, who has been acting Volunteer Coordinator since Anne Rogers' departure last year, has recently moved up. Well, at least to the next floor of TNRCC headquarters. Tina's move is a result of her accepting a position with the TNRCC's Public Drinking Water Section. In her new role as a Chemical Monitoring Specialist, Tina will be overseeing organic chemical sampling for more than 5,000 Texas public drinking water systems, assuring their compliance with state drinking water quality standards.

Tina's hard work and willingness to take on any duties thrown her way will be missed by all those who had the opportunity to work with her. Although Tina is no longer on the Texas Watch team, she will always be considered part of it. Congratulations and good luck, Tina: see you around the drinking fountain!

Volunteers and Partners: Remember Your QC Sessions

by Michele Blair, Texas Watch Volunteer Coordinator

As the new volunteer coordinator, one of my goals is to help volunteers and partners comply with the Texas Watch Quality Assurance Project Plan (QAPP). As most of you know, the QAPP is Texas Watch's guidance document that ensures the information volunteers collect is accurate and usable. It is also part of the QAPP that all volunteer monitors submit quarterly duplicates, and attend two Quality Control (QC) sessions each year to verify the accuracy of their test equipment and monitoring procedures.

To help make this as painless as possible, I will be gearing up in the near future to help partners coordinate QC sessions around the state. Please be sure to schedule time for these sessions if you want your monitoring data to be considered Level 1 data. Although all data submitted by volunteers is entered into the Texas Watch Volunteer Monitoring database, only data that conforms with Texas Watch QAPP guidelines (Level 1) can be incorporated with professional monitoring data into the TNRCC's Watershed Management Program.

So schedule those QC's, and keep that Level 1 data rolling in!

continued from page 3 - *The Big Experiment*

pretation, or how monitors "read" the color of the completed nutrient tests, may be a critical factor in the precision of results recorded for these tests. It should be noted that the sample size for this experiment was 11 monitors, so the representativeness of these findings for the total population of monitors is limited.

Recommendations. During the experiment, monitors used a variety of approaches to visually compare the color of the prepared samples with the colors in the comparator. River Watch advises monitors to hold a white background (a blank sheet of paper or the back of the monitoring manual) about eight to ten inches behind the comparator and to view the prepared sample in the test tube against this background. For the phosphate test, the blue test tube cap should be removed before viewing.

As a rule, when unusual values are found for any monitoring variable, **monitors should repeat the test and record both results**. This will help validate the accuracy of the results. To ensure full color development, monitors are reminded to wait a full five minutes before reading and recording the results of these nutrient tests.

River Watch appreciates the contribution of all the monitors who participated in this experiment. Thanks also to the LCRA Environmental Lab, LaMotte Company staff, and to LCRA colleagues who helped us accomplish our objectives in this project. Special thanks to Beth Davis, City of Austin, who prepared the tests for the "comparator interpretation" exercise.

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lake, overall it is still suitable for moderately tolerant aquatic life. Qualitative biological sampling tends to support this interpretation. Fishing has documented the occurrence of Bass, Blue Catfish, Yellow Bullhead, Crappie, Bluegill Sunfish, and Alligator Gar. Invertebrate sampling from the vegetation and bottom near the north dock area (site 3) has revealed numerous fresh water shrimp, damselflies (family Lestidae), dragonflies (family Libellulidae), mayflies (family Baetidae) with numerous molts from another family appearing in August each year, and amphipods with modest amounts of crayfish, molluscs and fly larvae. Aquatic plants are relatively sparse, especially after the 1994 floods. Except for the low clarity, monitoring to date suggests that currently the lake is reasonably healthy, with the most significant problem being related to the heavy siltation occurring at the mouth of the main stream.

Monitoring is currently being conducted by members of an Environmental Explorer post along with several adults from the Council Conservation Committee. However, two of the camp rangers and several scouts and leaders have recently completed certification as Texas Watch Monitors, and will soon take over responsibility for regular lake monitoring, and at least one additional site in southwest Houston. Involvement of the full-time camp staff will make it easier to collect rainfall data and make observations associated with unusual short duration events along with performing the regular monthly monitoring. Data compilation and analysis for the camp will still be handled by the Conservation Committee.

Although this summary has been brief, it was intended to emphasize the state of the monitoring efforts by the Sam Houston Area Council, including the breadth of interrelated data being collected and the variability of "routine" measurements. While these measurements and observations provide Texas Watch and the TNRCC with monitoring data they require, the activities and ideas involved in volunteer monitoring also can be applied to satisfying a number of Boy Scout advancement requirements related to environmental education.

The second part of this series will explore in more detail how environmental monitoring activities can be adapted to include troop service work, Eagle Scout projects, Environmental Science and Soil & Water Conservation Merit Badges, and portions of the National Hornaday Award for conservation.

Editor's note: Look for Part II of Scouts & Texas Watch in the Fall issue of Texas Watch.

EVENTS & ANNOUNCEMENTS

New Texas Watch Publication Available

The new Texas Watch *Manual for Conducting a Watershed Survey* is now available. The 42-page manual will equip your group to survey your stream or watershed, and make a record of its history and geography, land and water uses, and potential and actual pollution sources. Information gathered though a watershed survey can be tailored to your group's goals. The survey can help teachers explain how land uses affect water quality, increasing students' understanding and sense of ownership of the watershed. The survey can also be used as a more in-depth community project for a science club or scout troop. Suggested activities include the preparation of detailed maps, collection and comparisons of historical and current data, and investigation of present and potential land use.

Single copies of the *Watershed Survey* (GI-232) are available free of charge through the *TNRCC Publications Catalog* (PD-001). The catalog also includes publications on related topics including nonpoint source pollution, recycling, pollution prevention, and environmental education. To order, call (512) 239-0028; write to *TNRCC Publications / MC195, P.O. Box 13087, Austin, TX 78711-3087*; or access the catalog via the TNRCC's web site at *http://www.tnrcc.state.tx.us/catalog.*

Scientific Diving at Aquarena Springs

Southwest Texas State University's Department of Continuing Education announces the introduction of Aquarena Center's Scientific Diving Program. The program teaches divers the skills needed to participate in underwater research projects in Aquarena's Spring Lake, while providing the opportunity to dive in perhaps the state's clearest and most biologically diverse lake.

The program offers two levels of study. The introductory Diving in Spring Lake Authorization Course focuses on the Edwards Aquifer, habitat, endangered species, archeology, and regulations governing Spring Lake. The two-day course, scheduled over a Saturday and Sunday, includes a classroom session, in-water drills, a night dive, and a morning dive. All participants must provide proof of dive certification and all SCUBA equipment. The cost of the course is $175 per diver.

Upon completion of the authorization course, divers are eligible to participate in research dive projects that periodically take place in Spring Lake. Divers may also choose to continue their training by enrolling in one of the Center's Research Speciality Courses. These speciality courses include: Fish Identification & Collection; Water Sampling; Underwater Archeology; Underwater Photography and Videography; and Underwater Navigation. The Research Speciality courses are scheduled on a regular basis, but course length and fees vary.

For more information on the program write Southwest Texas State University, Aquarena Center, Scientific Dive Program, 601 University Dr., San Marcos, Texas 78666, or call (512) 245-7560.

Upcoming TNRCC Lake & River Cleanup and HHW Events

Saturday, September 20 - The annual **Trinity River Cleanup** event will take place at several sites in the **Dallas and Ft. Worth** area. For more information, contact Dana Macomb with the TNRCC's Lake & River Clean-Up program at 512/239-4745.

Saturday, September 27 - The annual **Town Lake Cleanup** will be held at sites in **Austin** along the Colorado River. For details on the event, contact Brenda Cash, with the TNRCC's Lake & River Clean-Up program, at 512/239-4744.

Saturday, October 18- The **Texoma Council of Governments** is holding a household hazardous waste (HHW) collection event for residents of Cooke, Fannin and Grayson Counties only, at the Sher-Den Mall in **Sherman**. For more information, contact John Ockels 903/813-3530

Saturday, October 18 - The **Lower Colorado River Authority** (LCRA) has scheduled a HHW collection event for the residents of the **Warrenton, La Grange and Shulenburg** service areas. A location is yet to be determined, but for more information contact Jack Ranney with the LCRA at 512/473-3333, Ext 7651.

Saturday, October 18 - The **Shell Development Company** is holding a HHW collection event for the residents of **Harris and Fort Bend Counties** at Westhollow Technology Center, 3333 Hwy. 6 South. For information contact Marty Pierce at 281/544-7254.

About Texas Watch

Texas Watch is a network of trained volunteers and supportive partners working together to help the TNRCC protect Texas' environment. Funded primarily through the federal Clean Water Act, Texas Watch trains students, teachers, and citizens to collect quality assured data and observations that can be used to assist professionals in developing local and regional management strategies. The purpose of the *Texas Watch* newsletter is to facilitate the exchange of information, ideas, and monitoring data between environmental monitors and supporting partners throughout Texas. For more information about Texas Watch, access our *web site* at: http://www.tnrcc.state.tx.us/txwatch

Address: TNRCC / Texas Watch, MC-150, P.O. Box 13087, Austin TX 78711-3087; *Phone*: 512/239-4720; *E-mail*: txwatch@tnrcc.state.tx.us

Subscribing – Texas Watch is published quarterly. For a free subscription, send your request to our postal or e-mail address, or access the Texas Watch web page.

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Reprinting Articles – Reprinting material from *Texas Watch* is encouraged. Please notify the editor of intentions and send a copy of your final publication to the above address.

The TNRCC's Texas Watch Team: *Program Director* - Eric Mendelman; *Aquatic Scientists* - Greg Rogers, Chris Loft; *Data Administrator* - Pat Davis; *Volunteer Coordinator* - Michele Blair; *Communications Coordinator / Editor* - Greg Bryant; *Special Projects* - Jane Sund, Randle Nichols

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Please contact Texas Watch at (512) 239-4720 if you have questions or comments about this publication, or if you would like to be added to the mailing list.

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